

Strategies for Protecting A Watershed:

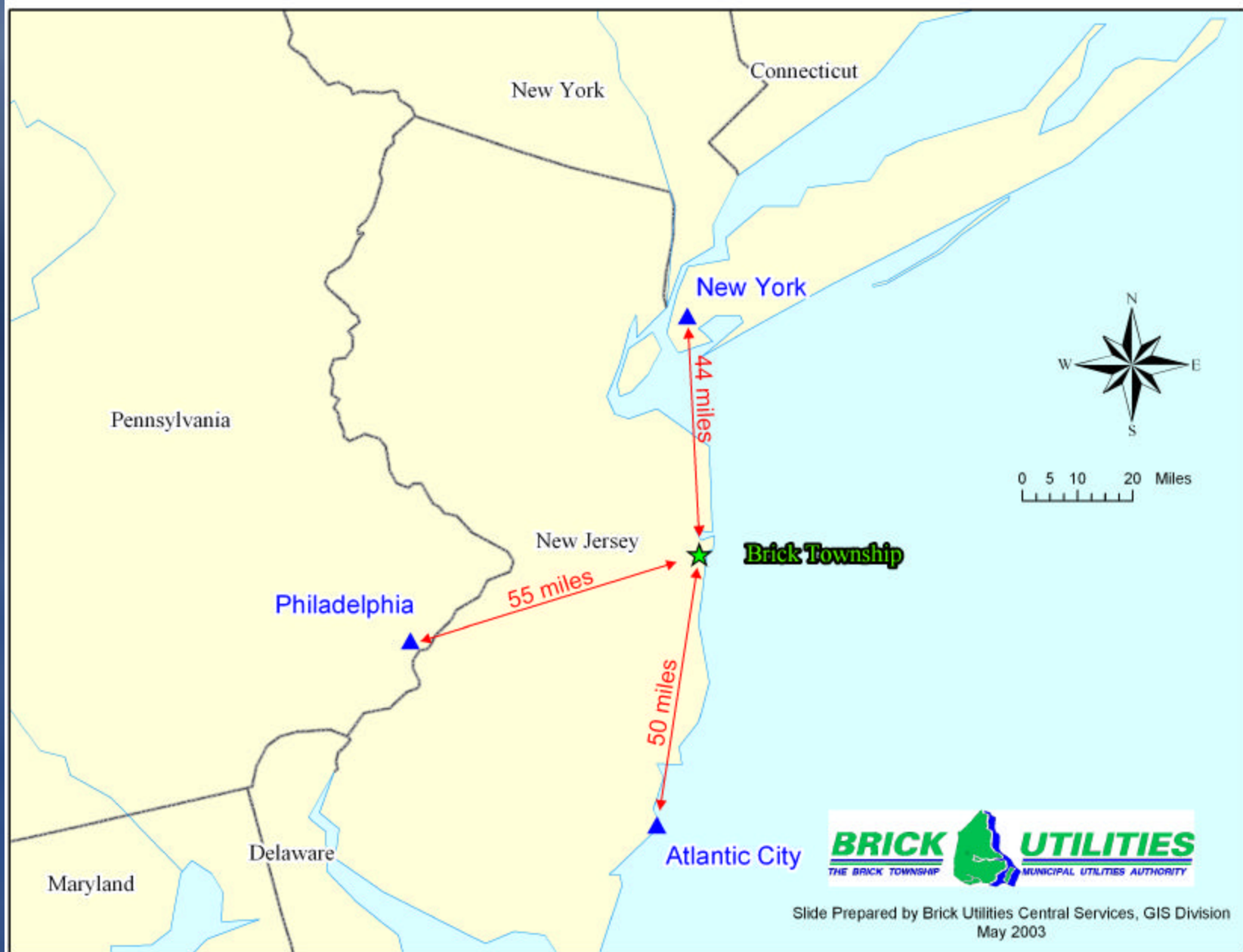
The Metedeconk River Watershed Management Plan Brick Township, New Jersey

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Presentation Overview

- ◆ From Ground Water to Surface Water
- ◆ Phase 1: Watershed Characterization and Preliminary Analysis
 - ◆ Summary of Main Findings
- ◆ Phase 2: An Approach for Cooperative Stormwater Management Implementation
- ◆ Other Activities in the Watershed



Slide Prepared by Brick Utilities Central Services, GIS Division
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From Ground Water to Surface Water

- ◆ 1969 – Brick MUA Formed
- ◆ 1970 – Installation of Shallow Wells – Cohansey Aquifer adjacent to the Metedeconk River
- ◆ 1973 – 8 Shallow Wells @ 2.25 MGD
- ◆ 1973 to 1982 – 4 Deep Wells @ 9.5 MGD from the Potomac-Raritan-Magothy Aquifer (PRM)
- ◆ 1985 – NJDEP establishes PRM Critical Area No. 1 (50% reduction of 1983 PRM usage or 1.88 MGD allocation)
- ◆ 1987 – Metedeconk River selected as Alternate Water Source
- ◆ 1991 – Primary withdrawal from the River

Current Water Demands

- ◆ 8.0 MGD Average Daily Demand
- ◆ 14.0 MGD Peak Demand (summer)
- ◆ 1% shallow wells
- ◆ 24% deep wells
- ◆ 75% surface water

Additional Water Supply Projects

- ◆ 1997 – Aquifer Storage and Recovery System
- ◆ June, 2004 – One-Billion Gallon Pumped Water Storage Reservoir
- ◆ Future – Desalination and/or Reclamation

Water Resource Protection: A National and State Priority

- ◆ **Source Water Assessment Programs being implemented nationally**
- ◆ **Watershed based planning and management a New Jersey initiative**
- ◆ **Water supply protection goals complement open space protection and environmental protection goals**
- ◆ **New Stormwater Phase II Rules critical piece of watershed protection**
- ◆ **Clean Water Act focuses on reducing pollutant loads to streams and lakes**

Water Resource Protection: Implementation a Local Affair

- ◆ Implementation of water resource protection often depends heavily on local ordinances, land use and zoning regulations
- ◆ Planning must balance strong technical analysis with extensive interaction with stakeholders to succeed
- ◆ Proposed NJDEP stormwater rules and Phase II stormwater permits now a requirement
- ◆ Watershed based permits preferred, more effective, and offer potential cost savings to Townships

Metedeconk River Watershed

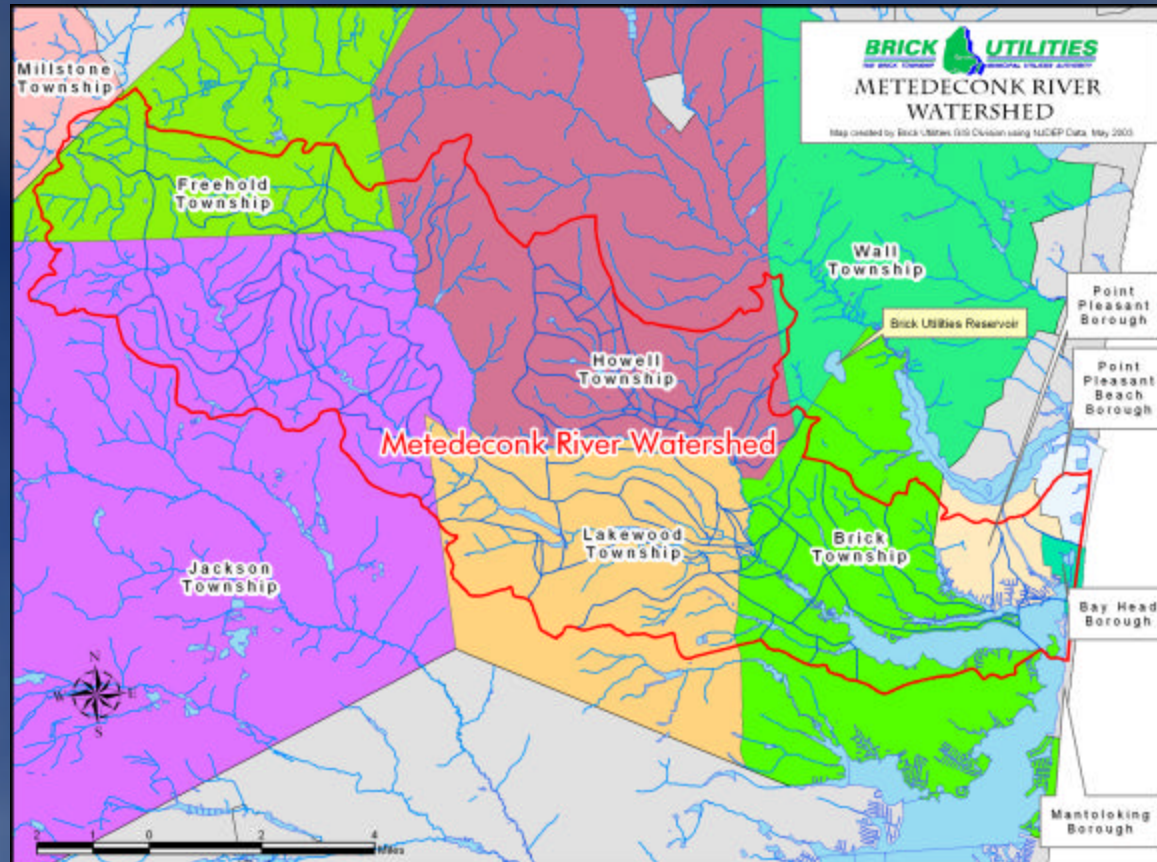
- ◆ BTMUA only purveyor utilizing the Metedeconk River
- ◆ 100,000 residents served
- ◆ 50,000 residents upstream
- ◆ Critical to BTMUA from a water quantity and quality standpoint
- ◆ BTMUA is the lead agency in the protection of the watershed

Metedeconk River Watershed Management Plan

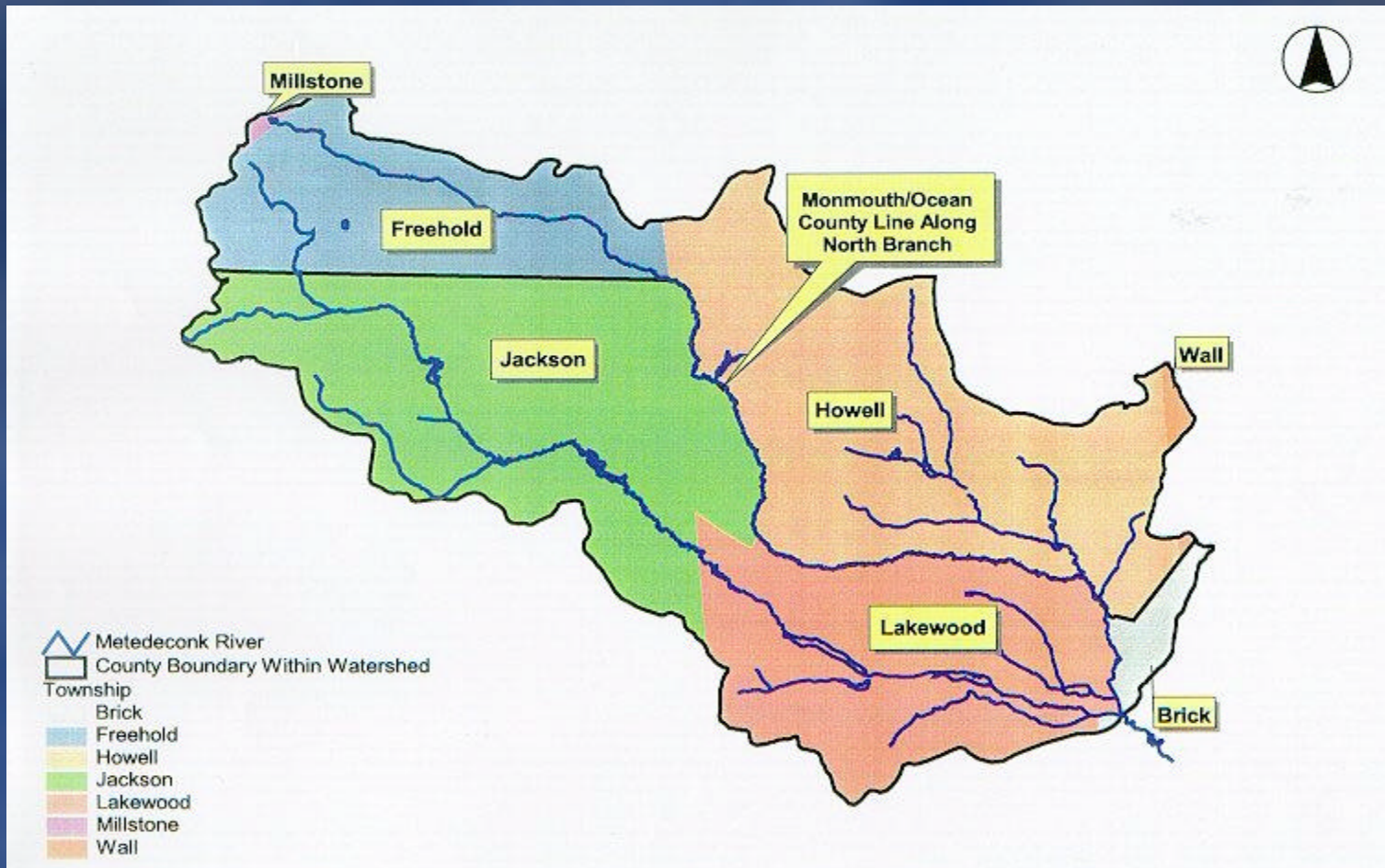
- ◆ 1989 – Preliminary Metedeconk River Watershed Study
- ◆ Within this changing regulatory setting, the Watershed Management Plan was launched by BTMUA in 1998
- ◆ Phase 1 (Study) completed in 2000 by CDM
- ◆ Phase 2 (Implementation) underway

Phase 1: Summary of Results

The Entire Metedeconk River Watershed – Head Waters to Barnegat Bay – 90 sq. miles



Municipalities within the Metedeconk River Watershed from the head waters to the BTMUA Intake – 70 sq. miles



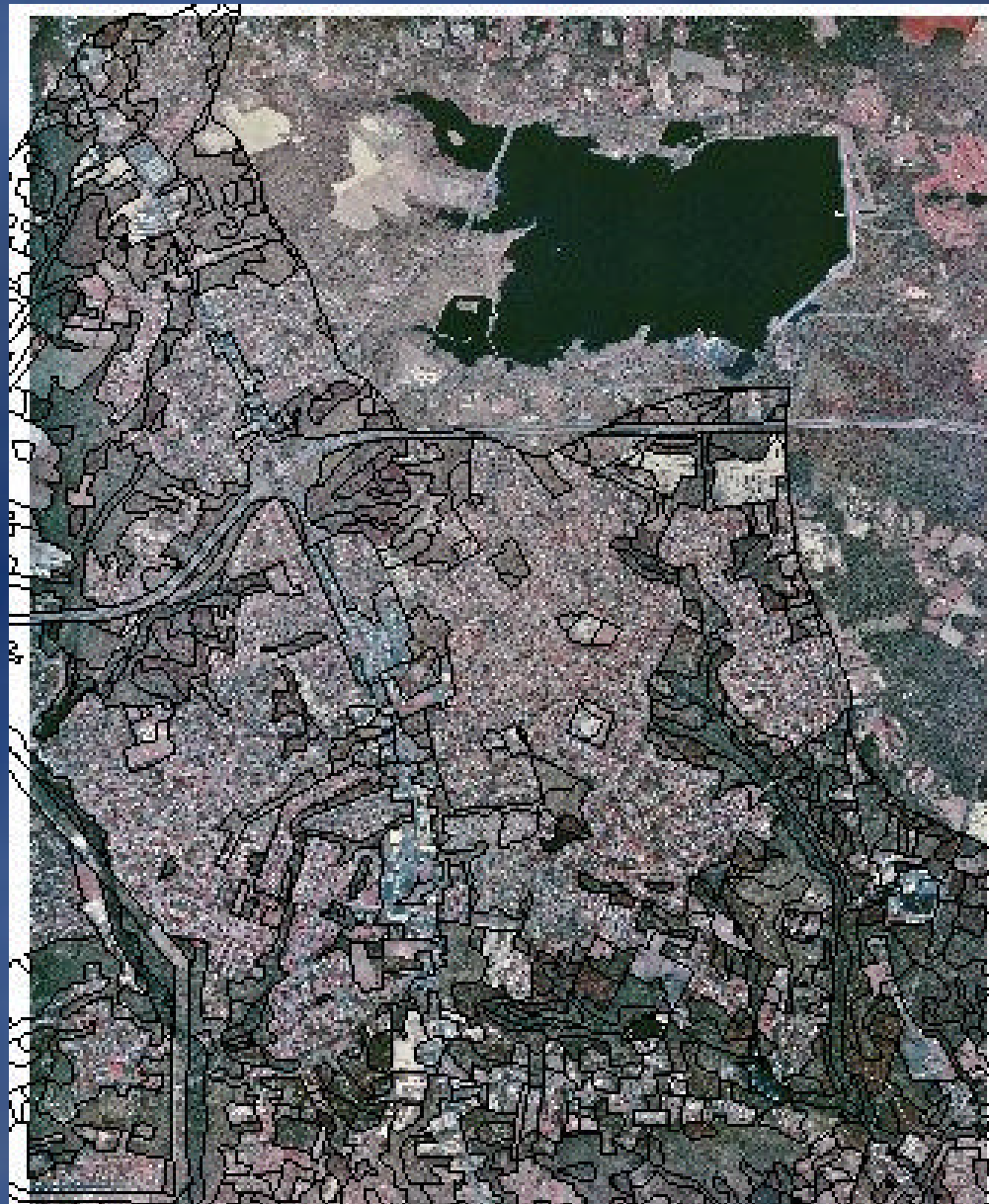
Counties and Municipalities In Watershed

- ◆ Ocean County Total – 37.7 square miles
 - ◆ Jackson Township – 21.4 square miles
 - ◆ Lakewood Township – 14.9 square miles
 - ◆ Brick Township – 1.4 square miles
- ◆ Monmouth County Total – 31.6 square miles
 - ◆ Howell Township – 20.7 square miles
 - ◆ Freehold Township – 10.4 square miles
 - ◆ Wall Township – 0.3 square miles
 - ◆ Millstone Township – 0.2 square miles

Primary Analyses Performed

- ◆ Land use/zoning
- ◆ Water quality
- ◆ Watershed Management Model (WMM) – pollutant loading modeling

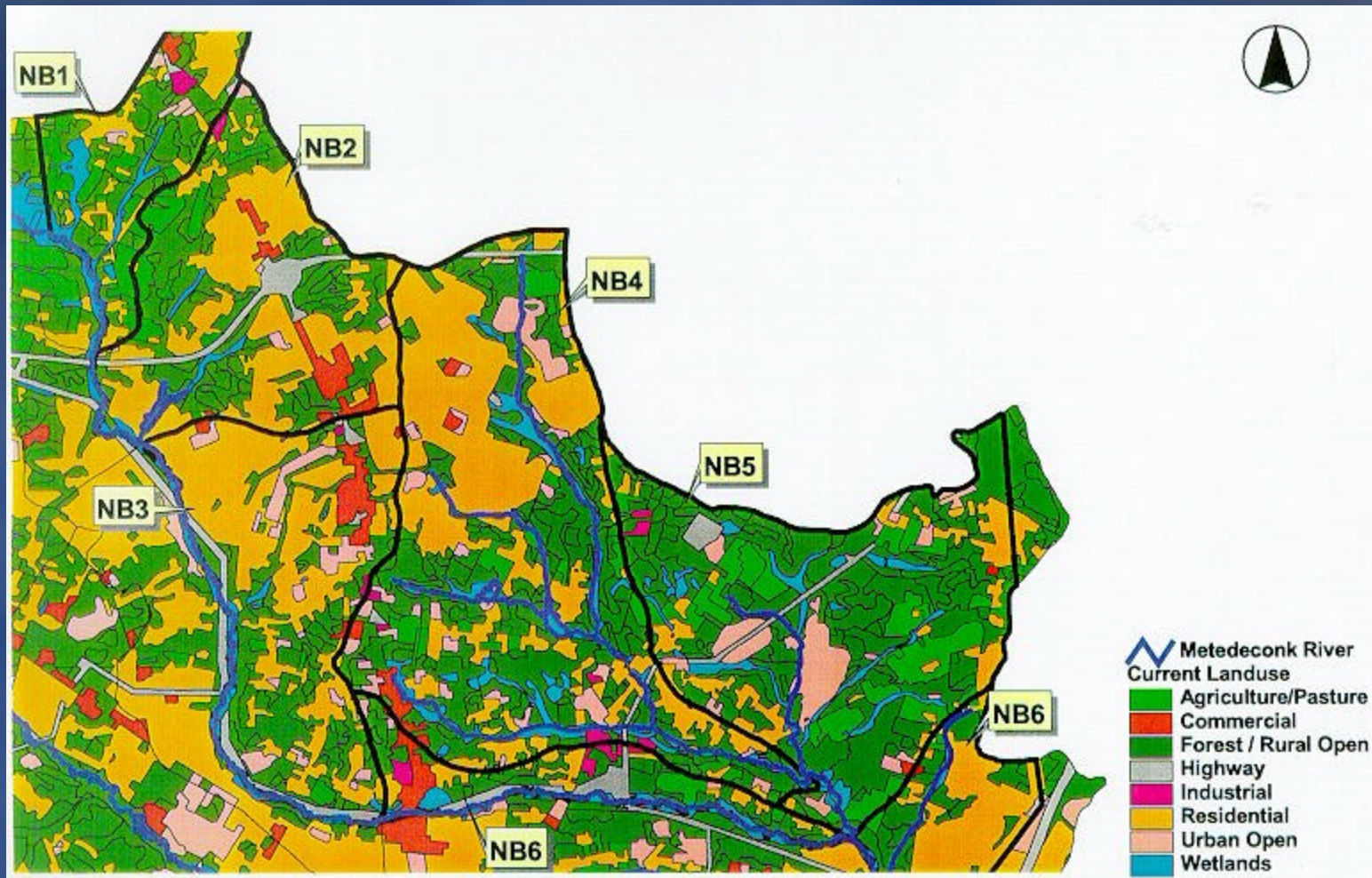
Orthophotography Enhances Land Use Delineations



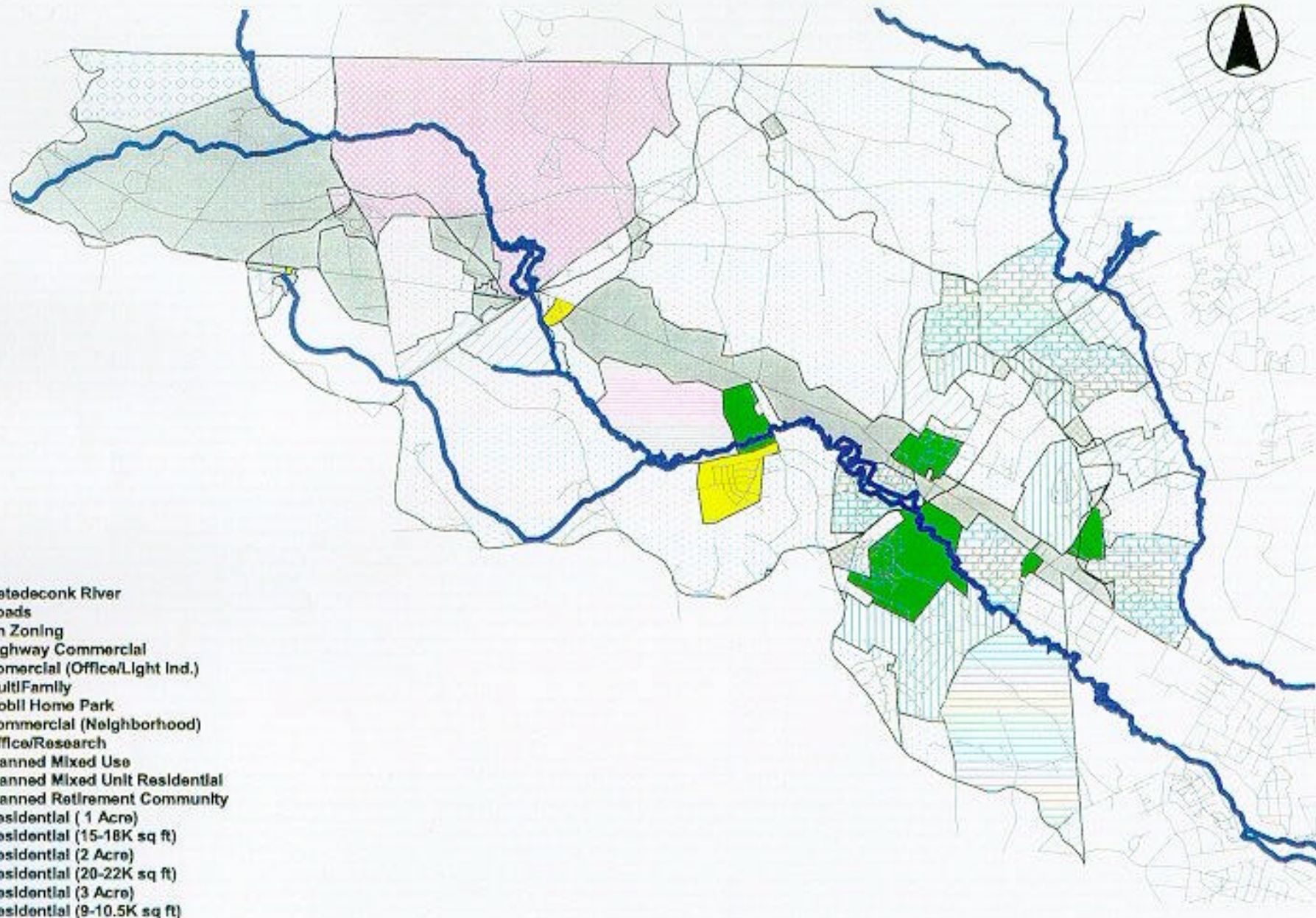
Land Use Characteristics and Zoning Patterns by Township

- ◆ Watershed still relatively undeveloped but present zoning not fully protective of watershed
- ◆ Build-out would result in drop of present forest/rural/open space from 46% to only 4.5%
- ◆ Industry/commercial would rise from 4% to 9.5%
- ◆ Residential would go from 27% to 65%

Example of Maps Produced: Howell Township Current Land Use



Example: Jackson Township Zoning



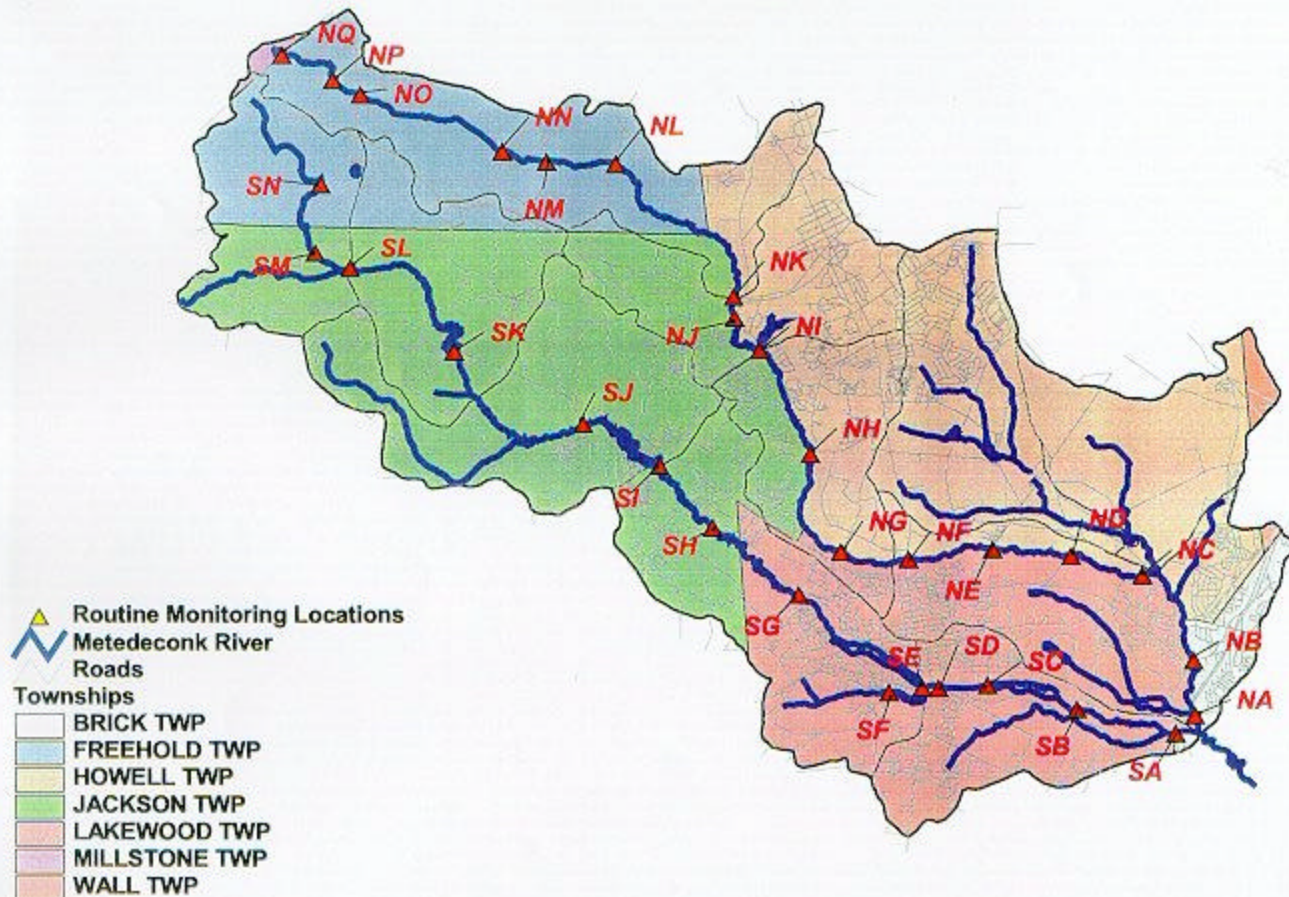
Land Use Characteristics and Zoning Within Riparian Buffer

- ◆ Riparian buffer still relatively undeveloped but not sufficiently protected
- ◆ Currently 8% residential but over 86% zoned for residential development
- ◆ 13% zoned for commercial/industrial
- ◆ Note: State wetlands regulations may protect some of this land

Metedeconk River Water Quality Sampling Program

- ◆ Uniquely Comprehensive Sampling Program
- ◆ 5 Sites along River sampled per day
- ◆ 17 sampling points North Branch
- ◆ 14 sampling points South Branch

Sampling Locations Along River



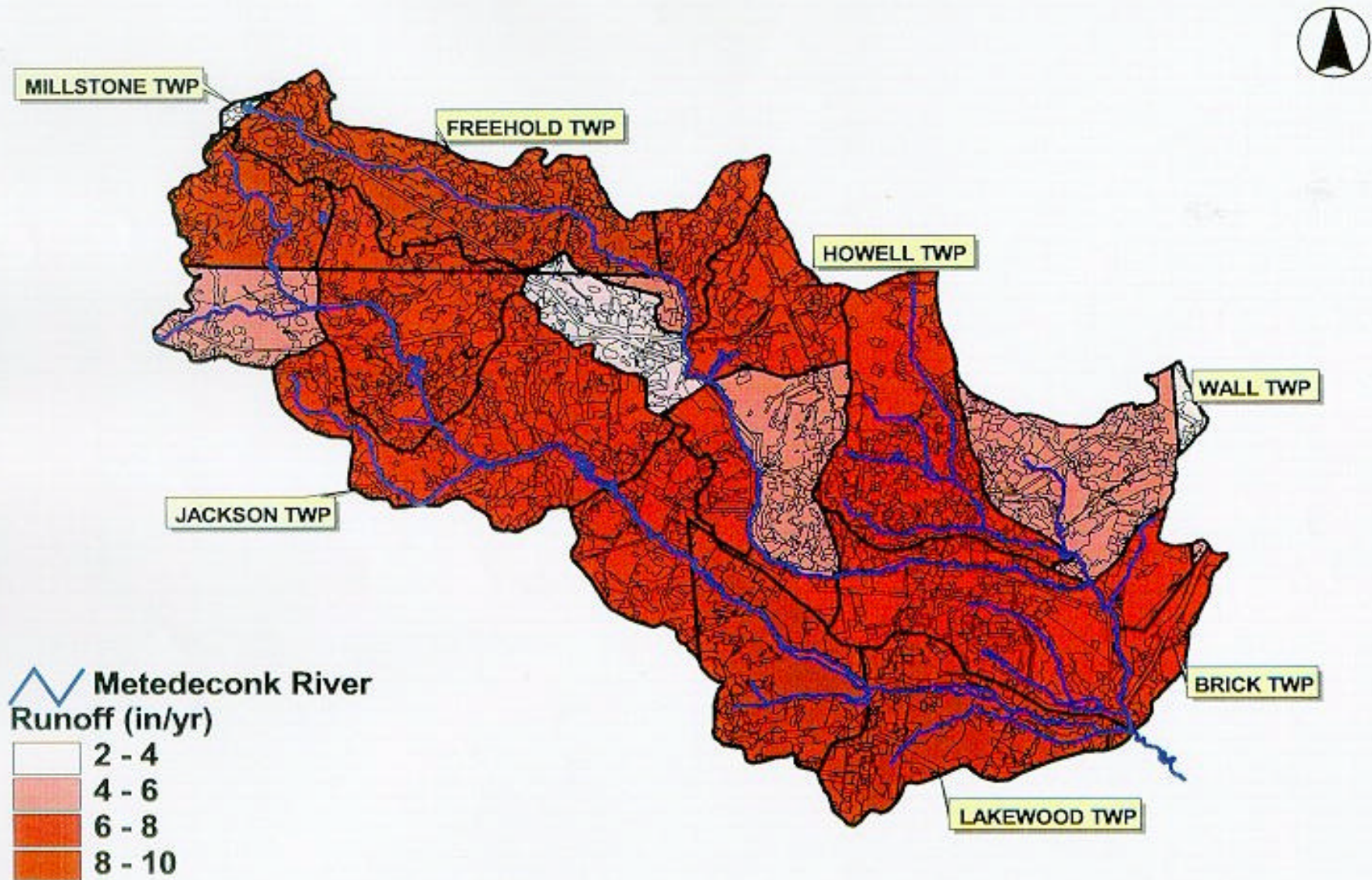
Surface Water Quality Analysis Summary Results

- ◆ Raw Water is generally of high quality
- ◆ Ammonia, conductivity, TDS, TSS, TKN, BOD Nitrate, Copper, Zinc all are at low concentrations
- ◆ Phosphate, TOC , Cadmium, Lead are at moderate to high concentrations

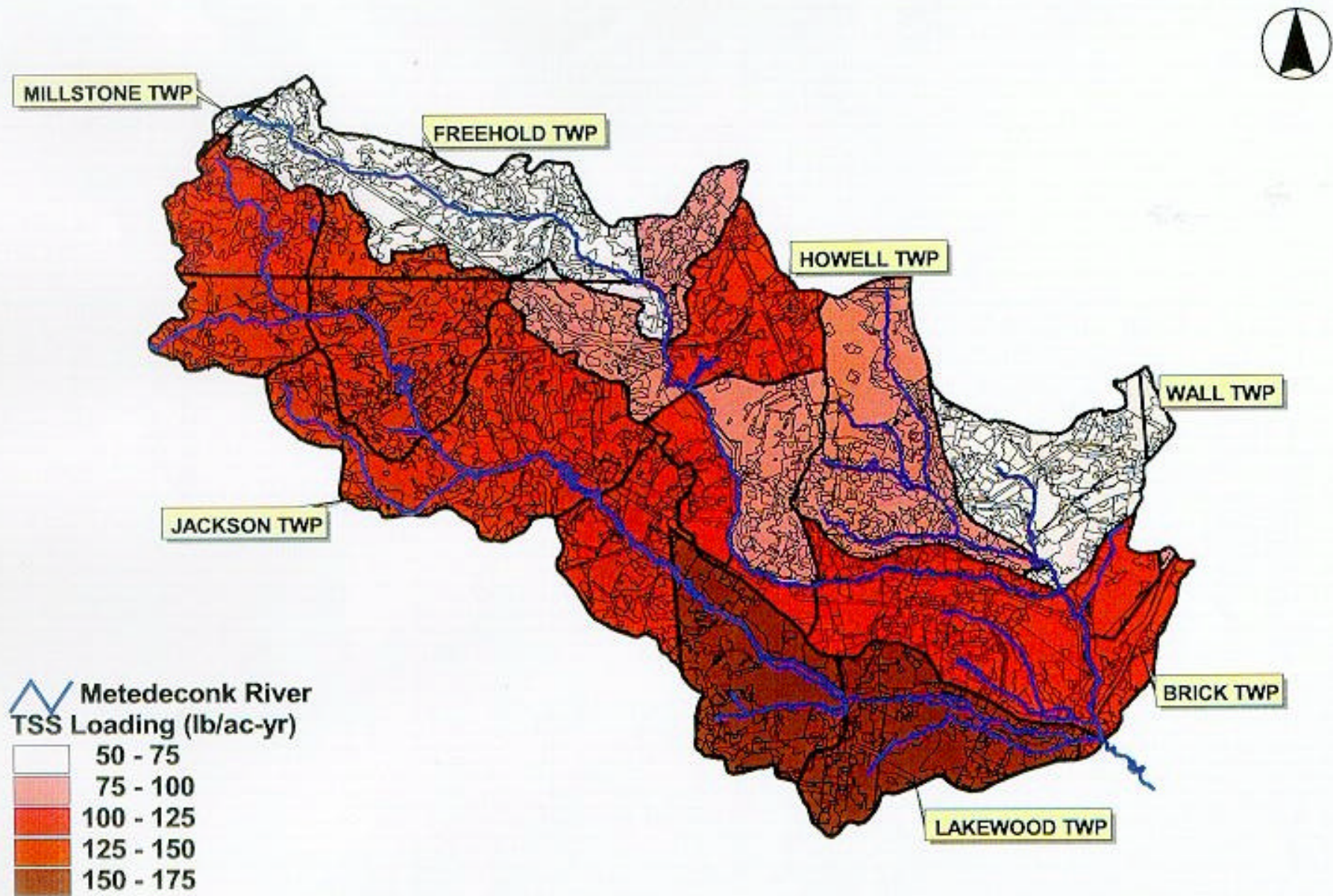
Watershed Management Model

- ◆ GIS based screening level pollutant loading model using Event Mean Concentration Data
- ◆ Estimated runoff, pollutant loads and concentrations for TP, DP, TKN, ammonia, lead, copper, zinc, cadmium, DO, BOD, TSS, TDS
- ◆ Provided estimates of percent impervious by land use type
- ◆ Used for present conditions and build-out scenario

Example: Model Generated Runoff to the Metedeconk River



Example: Model Generated TSS Loading to the Metedeconk River



Preliminary Problem Analysis: Contaminants

- ◆ Raw Water Quality of Metedeconk is presently excellent
- ◆ Stormwater impacts presently limited by amount of open space in watershed and low percentage of impervious surface
- ◆ WMM modeling results plus water quality data provided insight into potential impacts of present zoning

Contaminants of Concern at Build-out Conditions

- ◆ Phosphorus: river is presently phosphorus limited, increases could result in algae blooms/turbidity in reservoir/lakes
- ◆ BOD: increases could result in low oxygen in the future
- ◆ Cadmium could exceed drinking water standard in future
- ◆ Lead: intermittently above action level and expected to increase

Analysis of Percent Impervious: a watershed on the cusp of change

- ◆ General Guidelines for Watershed Protection
 - ◆ 0-10 percent: little impact
 - ◆ 10 - 25 percent: low to moderate impacts to water quality, aquatic habitat
 - ◆ greater than 25 percent: moderate to severe impacts to water quality, flow characteristics, aquatic habitat
- ◆ Metedeconk presently at 10.8 percent
- ◆ At Build-Out, watershed as a whole would be over 16%

Potential Gaps in Regulations/Ordinances

- ◆ Township Stormwater Management Plans need to be developed
- ◆ Stormwater Ordinances need to be updated to reflect water quality concerns
- ◆ Riparian Buffers need better protection
- ◆ Allowable Impervious Surface percentage within watershed should be reduced
- ◆ Wetlands need to be better protected
- ◆ Watershed Protection should be incorporated into updates of Master Plans

Phase 1 Recommendations

- ◆ BTMUA should continue monitoring to build a long-term data base
- ◆ Phase 2 should be initiated to include extensive Township and other Stakeholder participation
- ◆ BTMUA should develop a groundwater model to assess aquifer yield and impacts of upstream groundwater withdrawals on river flow

Phase 1 Recommendations

- ◆ BTMUA should improve its GIS coverages of watershed to facilitate management
- ◆ BTMUA should develop public education program (watershed tours, brochures)
- ◆ BTMUA/Stakeholders should explore possible funding for BMP demonstration projects
- ◆ BTMUA should work with Townships to jointly develop stormwater management plans

Metedeconk River Watershed Management Plan: Phase 2 – Implementation

- ◆ **The BIG Question: “What’s in it for me?”**

Phase 2 Objectives

- ◆ **Work with upstream Municipalities and Barnegat Bay stakeholders**
- ◆ **Develop a cooperative approach to meet the new Phase II stormwater rules and to meet stormwater permit requirements**
- ◆ **Share resources and develop watershed wide program to meet Stormwater Permit requirements**

Recent Regulatory Changes Provide New Opportunities

- ◆ **Proposed Metedeconk River Category 1 Status due to its Exceptional Water Supply Significance**
- ◆ **Updated NJ Stormwater Management Rules**
- ◆ **NJPDES Permitting for Stormwater Discharges (Phase II)**

Metedeconk River Category 1 Status

- ◆ Establishes a 300 foot buffer or “Special Water Resource Protection Area” adjacent to Category 1 waters
- ◆ No direct stormwater discharges allowed into Category 1 waters
- ◆ Establishes a non-degradation policy that limit increases of pollutant loads.

NJ Phase II Stormwater Regulations – Basic Requirements

Public Education/Outreach

- ◆ You Must Implement a Public Education Program



Some examples of storm water educational materials

NJ Phase II Stormwater Regulations – Basic Requirements Public

Involvement/Participation

- ◆ You Must Comply with Public Notice Requirements
- ◆ You Must Define Appropriate BMPs



Storm drains can be labeled with stencils to discourage dumping

NJ Phase II Stormwater Regulations – Basic Requirements

Illicit Discharge Detection/Elimination (1 of 3)

- ◆ You Must Have a Program to Identify and Eliminate Illicit Discharges



One of the ways to identify illicit connections is by inspecting storm drain system using video equipment (Source: Drain Patrol, No date)

NJ Phase II Stormwater Regulations – Basic Requirements

Illicit Discharge Detection/Elimination (2 of 3)

- ◆ You Must Develop a Storm Sewer Map Showing Outfalls and Waters of the U.S.
- ◆ Note: at this time, mapping of the entire storm sewer system is not required



NJ Phase II Stormwater Regulations – Basic Requirements

Illicit Discharge Detection/Elimination (3 of 3)

You Must:

- ◆ Prohibit Through Ordinance Non-Stormwater Discharges
- ◆ Have a Plan to Detect and Address Non-Stormwater Discharges, Including
 - ◆ Illegal Dumping
 - ◆ Inform Public Employees, Businesses, and the General Public of Hazards



Many times an aged or failing septic system requires tank replacement
(Source: Texas A&M University, 1995)

NJ Phase II Stormwater Regulations – Basic Requirements

Construction Site Stormwater Runoff Control

- ◆ You Must Have a Plan for Construction Sites with Land Disturbance of 1 Acre and Greater



Silt fences prevent the offsite transport of sediment

NJ Phase II Stormwater Regulations – Basic Requirements

Post-Construction Stormwater Management

- ◆ You Must...Have a Program to Minimize Water Quality Impacts From Projects > 1 AC
- ◆ Have BMPs Appropriate For Your Community
- ◆ An Ordinance to Address Post-Construction Runoff
- ◆ Ensure Adequate O&M of BMPs

NJ Phase II Stormwater Regulations – Basic Requirements

Pollution Prevention/Good Housekeeping

- ◆ You Must...Have an O&M Program, Including Employee Training
- ◆ At a Minimum Consider:
 - ◆ Reduce Floatables
 - ◆ Reduce or Eliminate Pollutants From Roads, Municipal Parking Lots, Storage Yards, etc.
 - ◆ Dispose Wastes Removed From Separate Storm Sewers Properly

Pollution Prevention /Good Housekeeping

- ◆ Types of BMPs
 - ◆ Street Sweeping
 - ◆ Catch Basin Cleaning
 - ◆ Car Washing
 - ◆ Illegal Dumping Control
 - ◆ Road Salt Storage



A street sweeper cleans up pollutants and sediments on the street to reduce the amount of pollutants entering receiving waters



Used oil can be disposed of at a waste collection facility, where it will be collected and later sent to a recycling facility

NJ Phase II Stormwater Regulations – Basic Requirements

Reports

- ◆ **Required Annually During First Term**
- ◆ **Must Include:**
 - **Status of Compliance**
 - **Appropriateness of Selected BMPs**
 - **Progress in Achieving Measurable Goals**
 - **Activities Planned During Next Year**
 - **Any Changes to BMPs, Goals**

NJ Phase II Stormwater Regulations – Basic Requirements

Measures of Success

- ◆ Does Not Need to Be Based on Water Quality Use:
 - Number of Catchbasins Cleaned
 - Lane-Miles of Streets Swept
 - Gallons of Oil Received
 - Number of Brochures Mailed
 - Number of Catch Basins Stenciled

New Jersey Proposed Stormwater Rules

- ◆ **All municipalities will have to develop a stormwater management plan or a regional stormwater management plan**
- ◆ **All municipalities will have to have stormwater ordinances to implement plan**
- ◆ **Phase II discharge permits will be based on implementation of new rules**

Relation of New Stormwater Rules to Watershed Plan

- ◆ Phase 2 aim is to work with upstream municipalities
- ◆ NJDEP-Townships to cooperate in the storm water planning effort on a watershed basis
- ◆ New rules and stormwater requirements are golden opportunity for cooperative approach that
 - ◆ Saves money
 - ◆ Is more effective
 - ◆ Provides opportunity for BTMUA to participate

Forging an Effective Phase 2 Watershed Protection Strategy

- ◆ A cooperative Stormwater Management Plan that satisfies NJDEP goal of establishing regional as opposed to municipal stormwater management plans
- ◆ Benefits Townships
 - ◆ Share cost of new permits and stormwater plans
 - ◆ More effective plan
- ◆ Benefits BTMUA
 - ◆ Implementation of water quality protection measures to protect water supply

Forging an Effective Phase 2 Watershed Protection Strategy

- ◆ BTMUA already has Phase 1 watershed management plan in place for the Metedeconk River
- ◆ Is a willing partner in stormwater management
- ◆ Can contribute technical expertise, support, public outreach, and modeling tools to help develop a Metedeconk Stormwater Management plan for all watershed Townships.

Forging an Effective Phase 2 Watershed Protection Strategy

- ◆ Non-point source pollutant loading model already exists, can be updated to meet needs
- ◆ Public education/outreach already started. Can be used as credit for permit requirements
- ◆ Extensive WQ data in integrated database ready for use
- ◆ GIS coverages of watershed already started and available

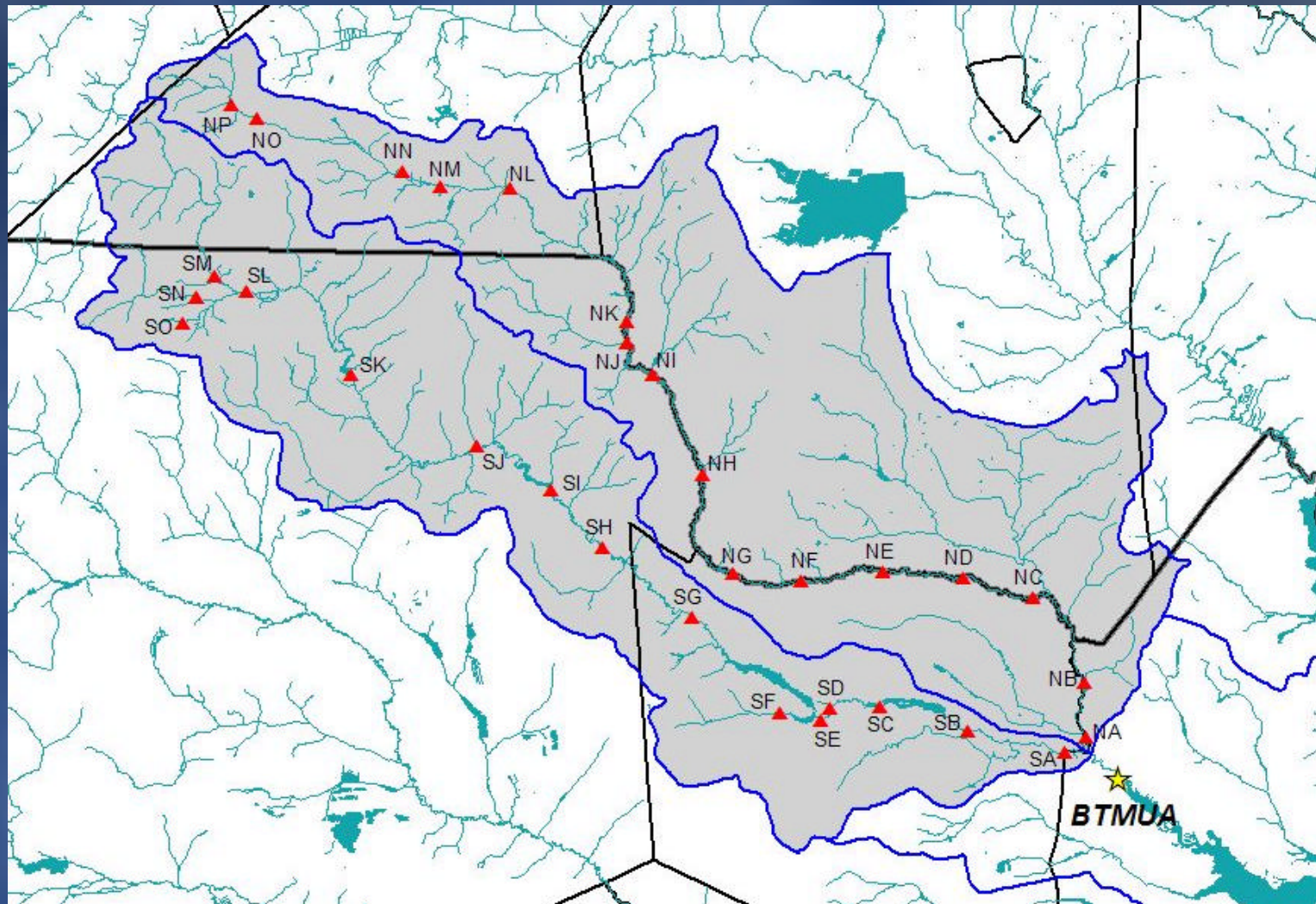
Brick MUA's Watershed Monitoring Program

- ◆ Watershed Team - Staff dedicated specifically to watershed monitoring
- ◆ “Source water quality assurance”
- ◆ Sampling conducted 7 days per week for a variety of parameters throughout the 70 mi² watershed area
- ◆ Specific sampling/monitoring routine for known sites of concern
- ◆ “Eyes and ears” on the watershed daily to identify potential problems



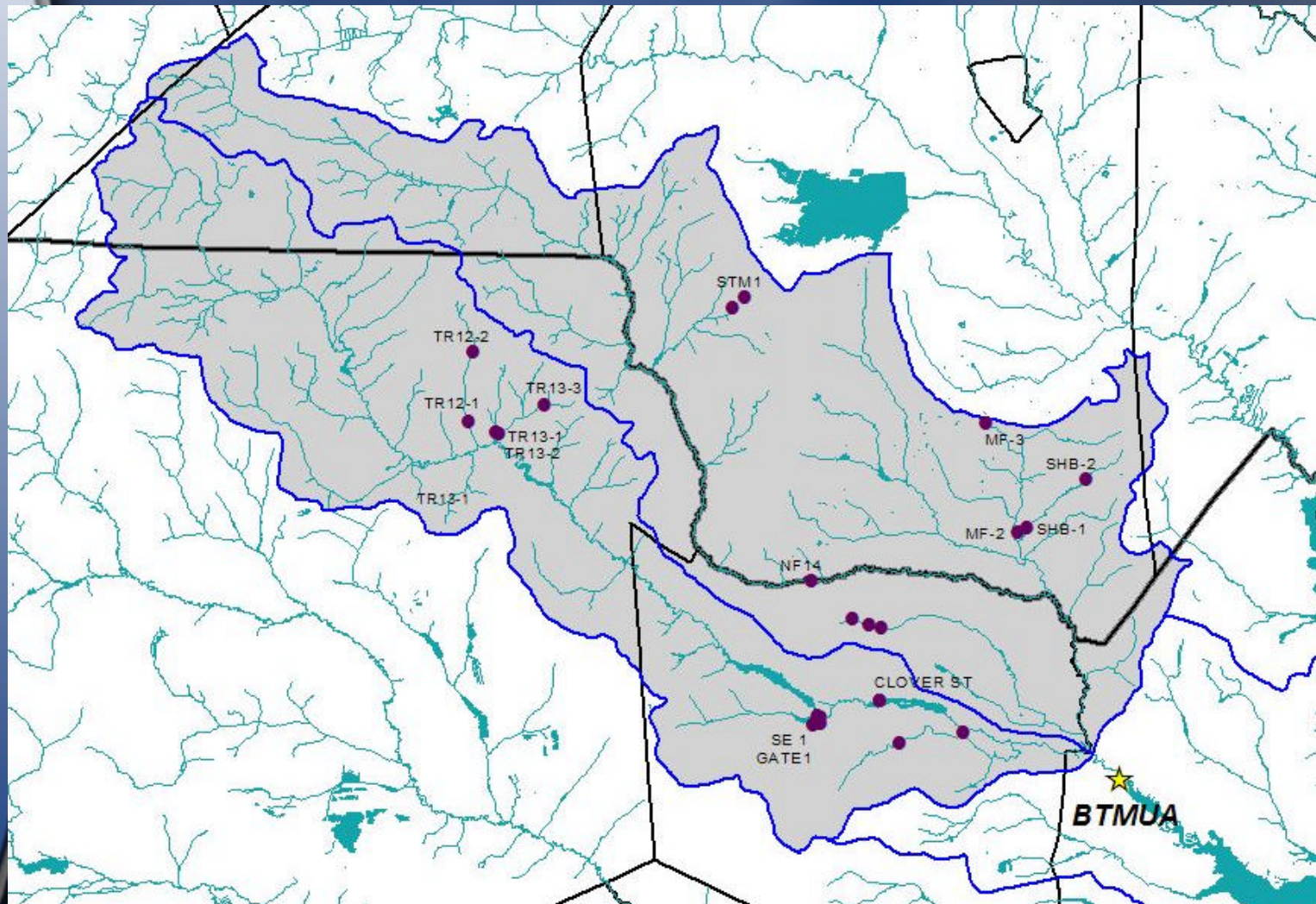
Brick MUA's Watershed Monitoring Program (cont.)

Daily Sampling Sites



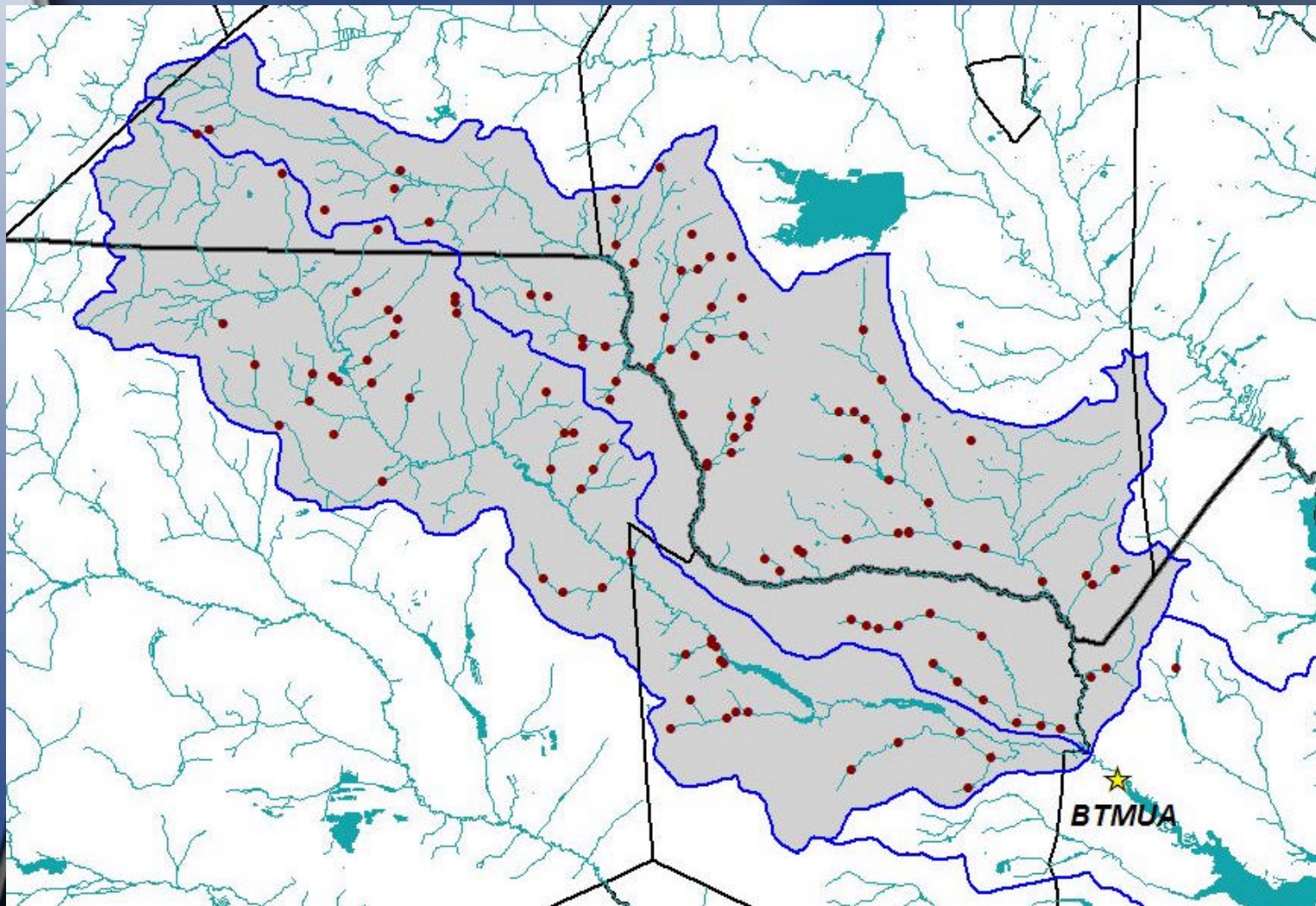
Brick MUA's Watershed Monitoring Program (cont.)

Monitored Sites



Brick MUA's Watershed Monitoring Program (cont.)

Tributary Sites



Brick MUA's Watershed Monitoring Program (cont.)

- ◆ **Extensive relational database of sampling results**
 - ◆ **More than 500,000 water samples have been collected/analyzed over the past 15 years**
- ◆ **Use of Geographic Information System (GIS) to get a better perspective on features and events in the watershed (i.e. relationships)**

Source Water Stewardship Exchange Project

- ◆ Project Partners: TPL, UMass, USEPA and the USDA Forest Service, local Townships, Counties
- ◆ **Project Objective:** “To demonstrate the use of land conservation and forest management practices as innovative and sustainable approaches to drinking water protection.”
- ◆ Main Focus - Stormwater management, BMP's, LID, source water protection and funding sources

Involvement in Upstream Development

- ◆ **Planning process allows for public involvement**
- ◆ The BTMUA has an OBLIGATION to watch for potential impacts to our water supply
- ◆ Efforts made to watch for new development applications that could adversely impact the Metedeconk River



Involvement in Upstream Development (cont.)

- ◆ Our position:
 - ◆ We are an “interested party”
 - ◆ Our major concern is water quality and quantity (recharge) – 70% river baseflow is from ground water
 - ◆ We want to assure developers are doing all they can to limit the impacts of their projects on our water supply
- ◆ Municipal planners have been contacted so they are aware of our concerns
- ◆ Environmental review of site plans by third party

The Future of the Metedeconk Watershed:

Some BTMUA Goals

- ◆ **Complete Phase 2 of the Metedeconk River Watershed Management Plan**
- ◆ **Establish a cooperative relationship with the upstream municipalities to protect the watershed**
- ◆ **Implement a Regional Stormwater Management Plan that is tailored to the specific issues affecting the Metedeconk Watershed**

The Future of the Metedeconk Watershed:

More BTMUA Goals

- ◆ Establish an application review process with municipal planning boards whereby BTMUA must have the opportunity to comment on new development proposals
- ◆ Mitigate the impacts of existing development on the River (i.e. retrofits, rain gardens, etc.)
- ◆ Create a Stormwater Utility for the Metedeconk Watershed
- ◆ Delineate strategic land parcels for future acquisition and preservation
- ◆ Adoption of the Category 1 Stream Classification

Watershed Protection is CRITICAL to not only the the BTMUA's Surface Water Supply but also the Ground Water Supply for our upstream neighbors

